



# Do you use conventional engine driven generators?

## Would you like to improve this process in the following areas?

- **Meeting environmental compliance regulations** -- Reduce hazardous waste disposal and air emissions. Regulatory areas include RCRA and NAAQS.
- **Improving workers' safety and health** -- Reduce maintenance worker exposure to chemicals. Natural Gas Fuel Cells (NGFC) units employ non-combustion, low-maintenance technology.
- **Increasing productivity** -- Reduce maintenance and logistical requirements. NGFC units are easily transportable, and require little maintenance.
- **Saving money** -- Reduce utility costs. NGFC units reduce costs by taking advantage of low cost natural gas and producing power and hot water with high efficiency.



200KW Natural Gas Fuel Cell  
Naval Hospital, NAS Jacksonville FL

*Natural Gas Fuel Cell technology offers several benefits over traditional power generating equipment. The electrochemical process is quiet, reliable and requires little maintenance. Exhaust emissions are exempted from air quality permitting requirements in California's South Coast and Bay Area AQMD and are well below any Federal, State, or Local requirements. Fuel cells can provide high quality power to a specific building, a local distribution system, or an isolated load. The supplemental heat, available in the form of hot water, is easily applied to industrial applications or use in swimming pool heating systems. Wastes normally associated with fossil fuel-powered electrical generators are eliminated because NGFCs have few moving parts. The heat recovery process can double the savings from power production with low cost natural gas. The Navy and Marine Corps are saving money by producing power with fuel cells at several facilities around the country.*

## How can you achieve these improvements?

Use Natural Gas Fuel Cells.

## How does this equipment work?

NGFC units operate electrochemically; extracting hydrogen ions from methane [CH<sub>4</sub>] in natural gas via an exothermic reaction to create a DC electric potential and producing 140 degree hot water as a byproduct. Solid-state electronics convert the DC energy into AC current.

## How will this equipment save you money?

By economical fuel switching and providing hot water for industrial uses.



## Typical Process Flow Diagram



**How can this technology eliminate or reduce pollution?**

This technology can replace petroleum fueled power generators. Implementation will result in the following pollution reductions:

- Avoid Use and Disposal of Waste Generator Lubricants
- Avoid Air Emissions Related to Fossil Fuel Combustion Generators

**Which shops can benefit most from this technology?**

This technology can be used wherever electrical power is required. Actual Navy applications include:

- Hospitals MCB Camp Pendleton, CA
- Central Heating Plants NTC Newport, RI
- Galleys NAS Fallon, NV
- Dormitories USNA Annapolis, MD
- Administration Facilities NAVO Stennis Space Center, MS
- Swimming Pools NCBC Port Hueneme, CA

**Take action: How can you implement this technology?**

- **Activity Shop & Work Center Personnel.** Contact your Pollution Prevention Program Manager. The P2 Program Manager can provide more information and conduct a more detailed analysis, and may be able to provide this equipment at no cost to a Shop or Work Center.

- **Activity Pollution Prevention Manager.** Depending on the application, the Environmental Program Requirements Cookbook may contain project submission information for annual budget requests sent to your claimant.

- **For Additional Technical Information.** For more information about this technology contact the technical POC listed below.

### Achieving Environmental Compliance Through Pollution Prevention

Every day the Navy faces the challenge of operating and maintaining the fleet while complying with environmental regulations. This burden can be reduced by implementing pollution prevention technologies and methods to reduce compliance requirements. This Fact Sheet is one in a series designed to encourage activities to implement pollution prevention technologies and methods. The overall goal of this series is to promote sustained environmental compliance at the lowest life-cycle cost.

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